Hypoglycemia in Type 2 Diabetes: An Underappreciated Management Challenge

- A Practical Case-Based Approach for Overcoming Barriers in the Primary Care Setting -
Disclosure of Potential Conflict of Interest

Dr. Luciana Parlea

Speaker honoraria - Abbott, Astra Zeneca, BMS, Bayer, Boehringer-Ingelheim, Lilly, Merck, Novo Nordisk, Sanofi-Aventis
Program Development

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Learning Objectives

• Upon completion of this program participants will be able to:
  ✓ Recognize hypoglycemia and describe its signs and symptoms
  ✓ Describe the 3 phases of treatment of hypoglycemia
  ✓ Name the causes of hypoglycemia
  ✓ Discuss the impact of hypoglycemia on patients (acute and chronic)
  ✓ Evaluate how the different antihyperglycemic therapies affect glycemic control, risk for hypoglycemia, as well as other risk factors as part of monotherapy and combination therapy
  ✓ Develop practical strategies to reduce hypoglycemia in clinical practice
I am having hypoglycemia **RIGHT NOW**. What would I be feeling?
Definition of Hypoglycemia

1. Development of neurogenic or neuroglycopenic symptoms

<table>
<thead>
<tr>
<th>Neurogenic (autonomic)</th>
<th>Neuroglycopenic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trembling</td>
<td>Difficulty Concentrating</td>
</tr>
<tr>
<td>Palpitations</td>
<td>Confusion</td>
</tr>
<tr>
<td>Sweating</td>
<td>Weakness</td>
</tr>
<tr>
<td>Anxiety</td>
<td>Drowsiness</td>
</tr>
<tr>
<td>Hunger</td>
<td>Vision Changes</td>
</tr>
<tr>
<td>Nausea</td>
<td>Difficulty Speaking</td>
</tr>
<tr>
<td></td>
<td>Dizziness</td>
</tr>
</tbody>
</table>

2. Low blood glucose (<4 mmol/L if on insulin or secretagogue)

3. Response to carbohydrate load
Clinical Definition of Hypoglycemia

• **Mild**
  – Autonomic symptoms present
  – Patient able to self-treat

• **Moderate**
  – Autonomic and neuroglycopenic symptoms
  – Patient able to self-treat

• **Severe**
  – Requires the assistance of another person
  – Includes: coma and seizure, episodes treated with IV dextrose or glucagon, or episodes requiring administration of oral carbohydrate by another

• **Hypoglycemia Unawareness**
  – Cognitive symptoms without autonomic symptoms


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What should be done **RIGHT NOW**?
I am symptomatic with a capillary glucose of 3.2 mmol/L.

NOW WHAT ??
3 Phases of Hypoglycemia Treatment

1. Acute
2. Intermediate
3. Future
Acute Phase

CONSCIOUS PATIENT

• Oral carbohydrate (glucose or sucrose tablets/solution)
  – 15 g if not severe
  – 20 g if severe (<2.8 mmol/L or needs assistance)
• Retest after 15 minutes
• Repeat 15 g carbohydrate if blood glucose is <4.0 mmol/L

UNCONSCIOUS PATIENT

• Glucagon 1 mg SC or IM

Acute = 15g CHO* + 15 minutes recheck

¾ cup OJ
3-4 glucose tablets
3 packs sugar
6 LifeSavers
1 tablespoon of honey

* CHO – Carbohydrate Food Choices

Intermediate Phase

“To prevent repeated hypoglycemia, once the hypoglycemia has been reversed, the person should have the usual meal or snack that is due at that time of the day. If a meal is >1 hour away, a snack (including 15 g of carbohydrate and a protein source) should be consumed”

Future

1. Why did it happen?
2. How do I prevent it?
Causes of Hypoglycemia

- Too little food
- Too much activity
- Too much circulating insulin (endogenous or exogenous)
<table>
<thead>
<tr>
<th>Class</th>
<th>Relative A1C lowering</th>
<th>Hypoglycemia</th>
<th>Weight</th>
<th>Other therapeutic considerations</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha-glucosidase inhibitor (acarbose)</td>
<td>↓</td>
<td>Rare</td>
<td>neutral to ↓</td>
<td>Improved postprandial control, Gl side effects</td>
<td>$$</td>
</tr>
<tr>
<td>Incretin agents: DPP-4 Inhibitors</td>
<td>↓↓ to ↓↓</td>
<td>Rare</td>
<td>neutral to ↓</td>
<td>Gl side effects</td>
<td>$$$</td>
</tr>
<tr>
<td>GLP-1 receptor agonists</td>
<td>↓↓</td>
<td>Rare</td>
<td>↓</td>
<td></td>
<td>$$$$</td>
</tr>
<tr>
<td>Insulin</td>
<td>↓↓↓</td>
<td>Yes</td>
<td>↑↑</td>
<td>No dose ceiling, flexible regimens</td>
<td>$-$$$$</td>
</tr>
<tr>
<td>Insulin secretagogue: Meglitinide</td>
<td>↓↓</td>
<td>Yes</td>
<td>↑</td>
<td>Less hypoglycemia in context of missed meals but usually requires TID to QID dosing Gliclazide and glimepiride associated with less hypoglycemia than glyburide</td>
<td>$$</td>
</tr>
<tr>
<td>Sulfonylurea</td>
<td>↓↓</td>
<td>Yes</td>
<td>↑</td>
<td></td>
<td>$</td>
</tr>
<tr>
<td>TZD</td>
<td>↓↓</td>
<td>Rare</td>
<td>↑↑</td>
<td>CHF, edema, fractures, rare bladder cancer (pioglitazone), cardiovascular controversy (rosiglitazone), 6-12 weeks required for maximal effect</td>
<td>$$</td>
</tr>
<tr>
<td>Weight loss agent (orlistat)</td>
<td>↓</td>
<td>None</td>
<td>↓</td>
<td>Gl side effects</td>
<td>$$$$</td>
</tr>
</tbody>
</table>
Robert

64 year old taxi driver
T2DM x 10 years
No known cardiovascular disease

- Metformin 1g BID
- Gliclazide MR 120 mg OD
- Ramipril 10 mg OD
- Rosuvastatin 10 mg OD
- Allopurinol 200 mg OD
Weight: 96 KG
Body Mass Index: 30
Heart Rate: 88 BPM
Blood Pressure: 130 / 80 mmHg
Fundus normal
Abdo benign
Reduced monofilament sensation both feet
A1C 6.1%
Creatinine 90 umol/L
Questions to Consider

1. Could Robert be having hypoglycemia?
2. What are Robert’s risk factors?
3. What would you ask Robert?
4. What will you do about it?
5. Why is hypoglycemia important?
Why is hypoglycemia important?
Potential Clinical Consequences of Severe Hypoglycemia

- Brain death\(^1\)
- ECG changes that have been associated with\(^2\)
  - Ventricular arrhythmias
  - Sudden death
- Nonfatal cardiac sequelae such as myocardial infarction\(^3\)
- Stroke\(^3\)
- Motor vehicle and other accidents\(^3\)
- Autonomic failure leading to unrecognized hypoglycemia\(^4\)
- Employment limitations\(^3\)

Do people with diabetes have more car accidents?
## Impact of Diabetes on Accident Rates

<table>
<thead>
<tr>
<th>Reference</th>
<th>Years</th>
<th>N</th>
<th>Type</th>
<th>RR Accident</th>
<th>RR Violation</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ysander</td>
<td>1952-61</td>
<td>250</td>
<td>1,2</td>
<td>0.65</td>
<td>0.76</td>
<td>per 100 drivers per year: not adjusted for driving exposure;</td>
</tr>
<tr>
<td>Ysander</td>
<td>1955-64</td>
<td>219</td>
<td>1,2</td>
<td>0.58</td>
<td>0.97</td>
<td>per 100 drivers per year: not adjusted for driving exposure;</td>
</tr>
<tr>
<td>Waller</td>
<td>1960-63</td>
<td>257</td>
<td>1,2</td>
<td>1.78</td>
<td>1.39</td>
<td>per million miles per year</td>
</tr>
<tr>
<td>Crancer</td>
<td>1961-67</td>
<td>7676</td>
<td>1,2</td>
<td>1.18</td>
<td>1.07</td>
<td>per 100 drivers per year: not adjusted for driving exposure;</td>
</tr>
<tr>
<td>Davis</td>
<td>1970</td>
<td>108</td>
<td>1,2</td>
<td>1.04</td>
<td>1.44</td>
<td>per 100 drivers per year: not adjusted for driving exposure;</td>
</tr>
<tr>
<td>De Klerk</td>
<td>1971-79</td>
<td>8623</td>
<td>1,2</td>
<td>1.52</td>
<td>-</td>
<td>Hospital Crash Admissions</td>
</tr>
<tr>
<td>Songer</td>
<td>1983-84</td>
<td>127</td>
<td>1</td>
<td>2.00</td>
<td>-</td>
<td>per 100 drivers per year</td>
</tr>
<tr>
<td></td>
<td></td>
<td>121</td>
<td>1</td>
<td>2.66</td>
<td>-</td>
<td>per 100 drivers per million miles</td>
</tr>
<tr>
<td>Eadington</td>
<td>1979-87</td>
<td>166</td>
<td>1</td>
<td>0.54</td>
<td>-</td>
<td>per million miles</td>
</tr>
<tr>
<td>Stevens</td>
<td>1981-86</td>
<td>354</td>
<td>1,2i</td>
<td>1.01</td>
<td>-</td>
<td>per 1.5 million km</td>
</tr>
<tr>
<td>Hansotia</td>
<td>1985-88</td>
<td>484</td>
<td>1,2</td>
<td>1.32</td>
<td>-</td>
<td>per 100 drivers per year: not adjusted for driving exposure;</td>
</tr>
<tr>
<td>Koepsell</td>
<td>1987-88</td>
<td>234</td>
<td>2</td>
<td>2.47</td>
<td>-</td>
<td>Injury per 100 drivers; matched for miles driven</td>
</tr>
<tr>
<td>Gresset</td>
<td>1988-89</td>
<td>121</td>
<td>2</td>
<td>1.01</td>
<td>-</td>
<td>per 100 drivers per year: not adjusted for driving exposure;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>18</td>
<td>1</td>
<td>1.13</td>
<td>-</td>
<td>per 100 drivers per year: not adjusted for driving exposure;</td>
</tr>
<tr>
<td>Mathiesen</td>
<td>1991-94</td>
<td>7535</td>
<td>1,2</td>
<td>0.13</td>
<td>-</td>
<td>per 100 drivers per year ; 29% response rate; selection bias</td>
</tr>
</tbody>
</table>

Accident Rates in the General Population

Fatal Crashes Per 100 Million Miles
1990 FARS and 1990 NPTS

Involvement Rate per 100 Million Miles

Age Group


The University of Michigan Transportation Research Institute
Ann Arbor, Michigan 48109-2150
Driving Guidelines

• Requirement for driving license and diabetes vary from province to province
• Requirements for professional versus private are different
• Any driver at risk of hypoglycemia (on secretagogues or insulin) should not drive if less than 5 mmol/L
• Any driver at risk of hypoglycemia should carry blood glucose testing equipment in car and test immediately if hypoglycemia is suspected
• Any driver at risk of hypoglycemia should carry the proper treatment of fast acting carbohydrate easily accessible in the vehicle
• Drivers should wait for 45 minutes before recommencing driving after treatment of a hypoglycemic episode
Diabetes and Dementia

Fremantle Diabetes Study: Dementia Increases Risk of Future SH

Proportion remaining free of severe hypoglycemia

Time after study entry (years)

Patients with normal cognition at baseline

Patients with cognitive impairment

Demented patients

Bruce DG et al. Diabetologia, 2009; 52:1808-15
ACCORD: Mortality Rates in Patients with Severe Hypoglycemia Requiring Medical Assistance

Annualized mortality rates (% per year) in patients with \( \geq 1 \) episode of severe hypoglycemia requiring medical assistance and in those with no such episodes in the ACCORD trial.

<table>
<thead>
<tr>
<th>Episodes of severe hypoglycemia</th>
<th>Standard Group</th>
<th>Intensive Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>1 or more</td>
<td>4.9</td>
<td>2.8</td>
</tr>
</tbody>
</table>

ADVANCE: Severe Hypoglycemia Was Associated With Adverse Clinical End Points and Death\(^1\)

Severe Hypoglycemia (n=231)  No Severe Hypoglycemia (n=10,909)

<table>
<thead>
<tr>
<th>Event</th>
<th>Patients With ≥1 Hypoglycemic Events, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Macrovascular Event(^b)</td>
<td>15.9 10.2</td>
</tr>
<tr>
<td>Major Microvascular Event(^b)</td>
<td>11.5 10.1</td>
</tr>
<tr>
<td>Death from Any Cause</td>
<td>19.5 9.0</td>
</tr>
<tr>
<td>CV Disease</td>
<td>9.5 4.8</td>
</tr>
<tr>
<td>Non-CV Disease</td>
<td>10.0 4.3</td>
</tr>
</tbody>
</table>

HR (95% CI):
- **Severe Hypoglycemia:** 3.53 (2.41–5.17)\(^a\)
- Major Macrovascular Event 2.19 (1.40–3.45)\(^a\)
- Death from Any Cause 3.27 (2.29–4.65)\(^a\)
- CV Disease 3.79 (2.36–6.08)\(^a\)
- Non-CV Disease 2.80 (1.64–4.79)\(^a\)

ADVANCE=Action in Diabetes and Vascular disease: PreterAx and Diamicron-MR Controlled Evaluation; CI=confidence interval; CV=cardiovascular; HR=hazard ratio.

\(^a\)Adjusted for multiple baseline covariates. \(^b\)Primary end points. Major macrovascular event=CV death, nonfatal myocardial infarction, or nonfatal stroke; major microvascular event=new or worsening nephropathy or retinopathy

* HR: Hazard Ratio

Are there other consequences of hypoglycemia?
Asymptomatic Episodes of Hypoglycemia May Go Unreported

- In a cohort of patients with diabetes, more than 50% had asymptomatic (unrecognized) hypoglycemia, as identified by continuous glucose monitoring\(^1\)
- Other researchers have reported similar findings\(^2,3\)

Hypoglycemia is a Barrier to Effective Management

Physicians concerns over the potential for hypoglycemia: 84%

Patients concerns over the potential for hypoglycemia: 67%

Peyrot et al. GAPP Survey Results. ADA 2011
# The Cost and Burden of “Minor” Hypoglycemia

<table>
<thead>
<tr>
<th>Reduced Well Being</th>
<th>Reduced Productivity</th>
<th>Increased Treatment Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased anxiety</td>
<td>Average productivity loss is ~$2,300/person/year</td>
<td>Blood glucose testing goes up: 5.6 extra tests within 7 days after hypoglycemia (~$1/strip)</td>
</tr>
<tr>
<td>Fear of repeated events compromising glycemic control</td>
<td>Following a nocturnal hypo: 23% arrive late/miss work, 32% miss a meeting/do not finish a task on time</td>
<td>Risk of suboptimal insulin dose* (25% of patients reduce dose)</td>
</tr>
<tr>
<td>Lower quality of life and need for lifestyle changes (e.g., reduced driving)</td>
<td>15 hours of work is lost</td>
<td>25% contact a health care professional after an episode</td>
</tr>
</tbody>
</table>

Brod M et al. *Value In Health* 2011; 5:665-71
Decrease in Treatment Adherence Is Associated With the Presence of Hypoglycemic Symptoms

Experience of Hypoglycemia is Associated with Increased Fear of Hypoglycemia

- Experiencing hypoglycemia
- Not experiencing hypoglycemia

Marrett 2009 P<0.001
Stargardt 2009
Vexiau 2008 P<0.001

Zhang Y et al. JCOM 2010; 17(12):547-57

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Hypoglycemia Is Associated With Increased Health Care Costs\(^1\)

- A retrospective cohort study of inpatients with diabetes compared those who developed laboratory evidence of hypoglycemia after 24 hours of hospitalization to those who did not develop hypoglycemia during their entire hospital stay

Base-case analysis (blood glucose <3.9 mmol/L)

<table>
<thead>
<tr>
<th>Hospital Outcomes, mean</th>
<th>Patients With Hypoglycemia</th>
<th>Patients Without Hypoglycemia</th>
<th>Between-Group Difference or Odds Ratio (unadjusted)a</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean Value</td>
<td>n</td>
<td>Mean Value</td>
</tr>
<tr>
<td>Length of hospital stay, d</td>
<td>8234</td>
<td>11.7</td>
<td>95,579</td>
<td>5.1</td>
</tr>
<tr>
<td>Hospital mortality, %</td>
<td>7994</td>
<td>4.8</td>
<td>93,012</td>
<td>2.3</td>
</tr>
<tr>
<td>Discharged to skilled nursing facility, %(^b)</td>
<td>7787</td>
<td>26.5</td>
<td>93,134</td>
<td>14.5</td>
</tr>
<tr>
<td>Total hospital charges, 2006 $</td>
<td>6020</td>
<td>\textbf{85,905}</td>
<td>72,681</td>
<td>\textbf{54,038}</td>
</tr>
</tbody>
</table>

\(^a\)Difference is shown as the percentage difference for charges, mean difference in days for length of stay, odds ratio for hospital mortality, and odds ratio for discharge to SNF.

\(^b\)Patients who were admitted to the hospital from a SNF were excluded from this analysis.

Prevention of Hypoglycemia

• If possible, use agents that cause less hypoglycemia
  – Incretin agents before secretagogues
  – Gliclazide rather than glyburide
  – Basal analogue insulin rather than NPH

• If elderly, assess cognitive function
  – If dementia present, simplify therapy

• Assess renal function
  – Adjust therapy as needed
## Type 2 Diabetes Therapies

<table>
<thead>
<tr>
<th>Class</th>
<th>Agent</th>
<th>Hypos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha-glucosidase Inhibitors</td>
<td>Acarbose (GlucoBay)</td>
<td>No</td>
</tr>
<tr>
<td>Biguanides</td>
<td>Metformin (Glucophage)</td>
<td>No</td>
</tr>
<tr>
<td>DPP-4 Inhibitors</td>
<td>Linagliptin (Trajenta)</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Saxagliptin (Onglyza)</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Sitagliptin (Januvia)</td>
<td>No</td>
</tr>
<tr>
<td>GLP-1R Agonists</td>
<td>Exenatide (Byetta)</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Liraglutide (Victoza)</td>
<td>No</td>
</tr>
<tr>
<td>Insulins</td>
<td>Analog Insulin</td>
<td>++++</td>
</tr>
<tr>
<td></td>
<td>Human Insulin</td>
<td>+++++</td>
</tr>
<tr>
<td>Meglitinides</td>
<td>Nateglinide (Starlix)</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>Repaglinide (GlucoNorm)</td>
<td>+++</td>
</tr>
<tr>
<td></td>
<td>Gliclazide (Diamicron)</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>Glimepiride (Amaryl)</td>
<td>++</td>
</tr>
<tr>
<td></td>
<td>Glyburide (Diabeta)</td>
<td>+++</td>
</tr>
<tr>
<td>Sulfonylureas</td>
<td>Pioglitazone (Actos)</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Rosiglitazone (Avandia)</td>
<td>No</td>
</tr>
</tbody>
</table>

**Hypoglycemia in ADOPT (patients with new-onset diabetes)**

- **Ps0.01 vs. Thiazolidinedione**
  - Thiazolidinedione: 9.8%
  - Metformin: 11.6%
  - Sulfonylurea: 38.7%
4T Study:
When Initiating Insulin: Less Hypoglycemia with a Basal Regimen

- Patients with type 2 diabetes mellitus and no prior insulin Rx

Biphasic insulin n=235
Basal insulin n=234
Prandial insulin n=239

Mean at 1 year (events/patient/year)

- Prandial: 12.0, \( P<0.002 \) vs. biphasic
- Biphasic: 5.7
- Basal: 2.3, \( P=0.01 \) vs. biphasic, \( P<0.001 \) vs. prandial

\( P=0.001 \)
Prevention of Hypoglycemia

• If possible, use agents that cause less hypoglycemia
  – Incretin agents before secretagogues
  – Gliclazide rather than glyburide
  – Basal analogue insulin rather than NPH

• If elderly, assess cognitive function
  – If dementia present, simplify therapy

• Assess renal function
  – Adjust therapy as needed
Mini-Cog Instructions

• 3 minute test to screen for cognitive defects in elderly

• 2-3 times faster than MMSE (Mini-Mental State Examination)

• Not affected by language, ethnicity or socioeconomic level

Mini-Cog Test

1. Remember these 3 words:
   – Blue
   – Apple
   – Train

2. Draw a clock with the arms at 11h10

3. What are the 3 words?

Mini-Cog Interpretation

- 0 word retained = Cognitive deficit
- 1 or 2 words retained → Examine the clock
  - Abnormal clock = Cognitive defect
  - Normal clock = No cognitive defect
- 3 words retained = No cognitive defect
  - No need to look at the clock

What To Do in Presence of Cognitive Defect?

• Consultation in geriatrics

• Adherence to medication
  – Pill boxes
  – Simplify therapy, particularly insulin therapy
  – Get the family involved

• Nutrition support
Consider A1C 7.1-8.5% if ...

- Limited life expectancy
- **High level of functional dependency**
  - Extensive coronary artery disease at high risk of ischemic events
  - Multiple co-morbidities
  - History of recurrent severe hypoglycemia
  - Hypoglycemia unawareness
- Longstanding diabetes for whom is it difficult to achieve an A1C ≤ 7%, despite effective doses of multiple antihyperglycemic agents, including intensified basal-bolus insulin therapy
Prevention of Hypoglycemia

• If possible, use agents that cause less hypoglycemia
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• If elderly, assess cognitive function
  – If dementia present, simplify therapy

• Assess renal function
  – Adjust therapy as needed
Antihyperglycemic Agents in Kidney Disease

CKD Stages (GFR)

- **ESKD** (<15) Not Recommended
- **Severe** (15-29) Caution / Reduced Dose
- **Moderate** (30-59) Safe
- **Mild** (60-89)
- **> 90**

- **Acarbose**
- **Linagliptin**
- **Saxagliptin**
- **Sitagliptin**
- **Exenatide**
- **Liraglutide**
- **Repaglinide**
- **Metformin**
- **Gliclazide/Glimepiride**
- **Glyburide**
- **Thiazolidinediones**
- **Insulin**

**CKD** = Chronic Kidney Disease
**GFR** = Glomerular Filtration Rate
**ESKD** – End Stage Kidney Disease
**Saxagliptin** 2.5 mg dose

Adapted from product monographs, CDA Guidelines, 2008 and Yale JF. December 2011

Based on Canadian product monographs as of Nov 13, 2011

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People in whom Hypoglycemia should be Particularly Avoided

• **Employment**
  – Truck driver, taxi driver, bus driver, pilot, train engineer, heavy machinery

• **Isolation**
  – People living alone, particularly if elderly

• **Elderly** with cardiovascular disease
Risk Factors of Hypoglycemia

- Insulin secretagogues and insulin
- Elderly
- Dementia
- Long duration of diabetes
- Prior episode of severe hypoglycemia
- Hypoglycemia unawareness
- Renal failure
- Delayed or skipped meal
- Alcohol intake
- Physical activity

Let's come back to Robert

64 year old taxi driver
T2DM x 10 years
No known cardiovascular disease
Weight: 96 KG, Body Mass Index: 30
Heart Rate: 88 BPM
Blood Pressure: 130 / 80 mmHg
Fundi normal, Abdo benign
Reduced monofilament sensation both feet
A1C 6.1%
Creatinine 90 umol/L

1. Could Robert be having hypoglycemia?
2. What are Robert’s risk factors?
3. What would you ask Robert?
4. What will you do about it?
5. Why is hypoglycemia important?

Metformin 1g BID
Gliclazide MR 120 mg OD
Ramipril 10 mg OD
Rosuvastatin 10 mg OD
Allopurinol 200 mg OD
Summary

1. Hypoglycemia remains an underappreciated and important problem for patients with type 2, as well as type 1, diabetes.

2. Severe hypoglycemia is associated with a number of potential adverse outcomes including increased cardiovascular risk, dementia, and motor vehicle accidents.

3. Even non-severe hypoglycemia may be associated with decreased well-being, productivity, and treatment adherence as well as increased treatment costs.

4. The frequency and impact of hypoglycemia can be minimized with proper patient education and appropriate selection of antihyperglycemic therapies.
Thank you

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